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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/572,680

03/20/2006

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EXAMINER

HO, HOANG QUAN TRAN

ART UNIT

PAPER NUMBER

2818

MAIL DATE

DELIVERY MODE

08/01/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/572,680

Applicant(s)

TOMOZAWA ET AL.

Examiner

Hoang-Quan Ho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 May 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Applicant's amendment dated May 9, 2007 in which claim 1 was amended, no claim was cancelled, no claim was withdrawn, and no claim was added has been entered of record. Currently, claims 1 – 16 are pending in light of the amendment.

Response to Arguments

Applicant's arguments filed May 9, 2007 is acknowledged and is responded as follows.

Applicant's arguments, see pgs. 6 – 7, with respect to the rejection of claims 1 and 3 – 16 have been fully considered but they are not persuasive in view of the following remarks.

Applicant has amended to state that the first layer to be continuous and the second layer to be parted in plural portions and believes to overcome prior arts. However, the Examiner believes that the claimed invention is still anticipated or rendered obvious by the prior arts.

With respect to the first layer being continuous, the Examiner acknowledges and agrees that Chen's ref. char. a are made up of islands, as noted on pg. 3830 in fig. 7 caption. However, each island is continuous in each of their own. Because applicant has not distinguished, as an example, that the first layer must cover the entire surface of the p-contact layer minus the pore(s) surface area, the Examiner takes the position that

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the claimed language allows that only one island of the ref. char. a, which is a continuous layer and in contact with a surface of a p-contact layer and thus anticipates the amended claim.

With respect to the second layer being parted in plural portions, the Examiner cannot agree with Applicant's argument. Applicant argued that the supposed second layer is the NiO layer, i.e., ref. char. b. However, the Examiner has cited ref. char. c that is equivalent as the second layer. See the previous Office Action and below. As depicted in figs. 2b and 7(d), ref. char. c, Ni-Ga-O layer are parted in a plurality of portions.

In view of the foregoing remarks, applicant has not demonstrated any distinguishable structural feature(s) to overcome prior arts cited. Therefore, the outstanding rejections still stand.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 and 3 – 15 are rejected under 35 U.S.C. 102(b) as being anticipated by Chen et al. (Microstructural investigation of oxidized Ni/Au ohmic contact to p-type GaN), hereinafter as Chen.

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Regarding claim 1, fig. 2b of Chen teaches an electrode for use in a gallium nitride-based compound semiconductor light-emitting device (pg. 3826, Introduction section, 1st par.) comprising a continuous light-permeable first layer (fig. 2b, ref. char. a; see Response to Arguments section above regarding 'continuous') which is in contact with a surface of a p-contact layer (fig. 2b, ref. char. p-GaN) in a gallium nitride-based compound semiconductor light-emitting device (pg. 3826, Introduction section, 1st par.) and which is capable of providing ohmic contact, and a second layer (fig. 2b, ref. char. c) which is in contact with a part of a surface of said p-contact layer, wherein said first layer comprises a metal, or an alloy of two or more metals, selected from a first group consisting of Au, Pt, Pd, Ni, Co, and Rh (pg. 3827 – 3828, Results and Discussion section, 2nd par.), and said second layer comprises an oxide of at least one metal selected from a second group consisting of Ni, Ti, Sn, Cr, Co, Zn, Cu, Mg, and In (pg. 3827 – 3828, Results and Discussion section, 2nd par.), and wherein the second layer is parted in plural portions on the surface of the p-contact layer (as seen in figs. 2b and 7(d), ref. char. c, Ni-Ga-O layer are parted in a plurality of portions).

Regarding claim 3, Chen teaches an electrode according to claim 1, Chen further teaches wherein a portion of the surface of said p-contact layer, which portion is not in contact with said second layer, includes an oxygen-lacking portion (fig. 7d, ref. char. Au-rich and/or ref. char. void; pg. 3830, 2nd par.).

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Regarding claim 4, Chen teaches an electrode according to claim 1, Chen further teaches which further comprises a third layer (fig. 2b, ref. char. b) on a surface of said first layer opposite the side in contact with said p-contact layer, said third layer comprising an oxide of at least one metal selected from said second group (pg. 3827 – 3828, Results and Discussion section, 2nd par.).

Regarding claim 5, Chen teaches an electrode according to claim 1, Chen further teaches wherein said first layer comprises an alloy of Au with Ni and/or Co (pg. 3827 – 3828, Results and Discussion section, 2nd par.).

Regarding claim 6, Chen teaches an electrode according to claim 1, Chen further teaches wherein said second layer comprises an oxide of Ni and/or Co (pg. 3827 – 3828, Results and Discussion section, 2nd par.).

Regarding claim 7, Chen teaches an electrode according to claim 4, Chen further teaches wherein said third layer comprises an oxide of Ni and/or Co (pg. 3827 – 3828, Results and Discussion section, 2nd par.).

Regarding claim 8, Chen teaches an electrode according to claim 1, Chen further teaches wherein said second layer accounts for 0.01 to 90% of the surface of said p-contact layer (as seen in figs. 2a – 2b and 7d).

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Regarding claim 9, Chen teaches an electrode according to claim 3, Chen further teaches wherein said oxygen-lacking portion accounts for 10% or more of the surface of said p-contact layer (as seen in fig. 7d; pg. 3830, 2nd par.).

Regarding claim 10, Chen teaches an electrode according to claim 1, Chen further teaches wherein said second layer has a thickness of 0.1 to 100 nm (pg. 3827, col. 1, Experiment section, 1st par.).

Regarding claim 11, Chen teaches an electrode according to claim 5, Chen further teaches wherein said alloy of said first layer has an Ni and/or Co content of 0.01 to 70 atom % (pg. 3829, 2nd par.).

Regarding claim 12, Chen teaches an electrode according to claim 1, Chen further teaches wherein said first layer has a thickness of 0.1 to 100 nm (pg. 3827, col. 1, Experiment section, 1st par.).

Regarding claim 13, Chen teaches an electrode according to claim 4, Chen further teaches wherein said third layer has a thickness of 1 nm or more (obvious in figs. 2b and 7d).

Regarding claim 14, Chen teaches an electrode according to claim 1, Chen further teaches wherein said first layer has one or more pores in a portion thereof (as seen in fig. 7d).

Regarding claim 15, Chen teaches an electrode according to claim 1, Chen further teaches wherein said first layer has a thick portion and a thin portion (as seen in fig. 7d).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen as applied to claim 1 above, and further in view of Sheu et al. (The effect of thermal annealing on the Ni/Au contact of p-type GaN), hereinafter as Sheu:

Regarding claim 2, Chen teaches an electrode according to claim 1, but does not explicitly teach wherein said first layer further comprises Ga. Sheu teaches that it is known in the art to provide first layer comprising Ga (pg. 3175, col. 2, last par. before Conclusion section). It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the device of Chen with the Ga-Ni and/or Ga-Au compound(s) of Sheu, in order to influence electrical properties of contacts. Also, Sheu teaches from the citation that Ga would form with Ni and/or Au due to chemical products between metal and semiconductor layers. So in essence, Chen's teaching may obviously form Ga-Ni and/or Ga-Au compound(s) even though it is not explicitly taught. It is proper to combine Chen and Sheu because they both teach p-type GaN devices.

Claim 16 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen and further in view of Chen et al. (U.S. Patent App. Pub. No. 2003/0010994 A1), hereinafter as ChenJ.

Regarding claim 16, Chen may not explicitly teach a gallium nitride-based compound semiconductor light-emitting device comprising an n-contact layer, a light-

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emitting layer and a p-contact layer formed on a substrate, which are composed of a gallium nitride-based compound semiconductor and which are sequentially stacked in the above order, and a negative electrode and a positive electrode which are formed on a surface of said n-contact layer and a surface of said p-contact layer, respectively, but teaches wherein said positive electrode is formed of an electrode according to claim 1 (see claim 1 rejection based on Chen).

Fig. 1 of ChenJ teaches that it is known in the art to provide a gallium nitride-based compound semiconductor light-emitting device comprising an n-contact layer (ref. no. 104), a light-emitting layer (ref. no. 106) and a p-contact layer (ref. no. 107) formed on a substrate (ref. no. 101), which are composed of a gallium nitride-based compound semiconductor (abstract) and which are sequentially stacked in the above order, and a negative electrode (ref. no. 105) and a positive electrode (ref. nos. 112 and/or 113; see claim 1 rejection based on Chen) which are formed on a surface of said n-contact layer and a surface of said p-contact layer, respectively (as seen in fig. 1). It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the device of Chen with the GaN based compound semiconductor LED of ChenJ, in order to provide a LED structure. It is proper to combine Chen and ChenJ because the both teach a light emitting device.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

This action is a **final rejection** and is intended to close the prosecution of this application. Applicant's reply under 37 CFR 1.113 to this action is limited either to an appeal to the Board of Patent Appeals and Interferences or to an amendment complying with the requirements set forth below.

If applicant should desire to appeal any rejection made by the examiner, a Notice of Appeal must be filed within the period for reply identifying the rejected claim or claims appealed. The Notice of Appeal must be accompanied by the required appeal fee.

If applicant should desire to file an amendment, entry of a proposed amendment after final rejection cannot be made as a matter of right unless it merely cancels claims or complies with a formal requirement made earlier. Amendments touching the merits of the application which otherwise might not be proper may be admitted upon a showing a good and sufficient reasons why they are necessary and why they were not presented earlier.

A reply under 37 CFR 1.113 to a final rejection must include the appeal from, or cancellation of, each rejected claim. The filing of an amendment after final rejection, whether or not it is entered, does not stop the running of the statutory period for reply to the final rejection unless the examiner holds the claims to be in condition for allowance. Accordingly, if a Notice of Appeal has not been filed properly within the period for reply, or any extension of this period obtained under either 37 CFR 1.136(a) or (b), the application will become abandoned.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoang-Quan Ho whose telephone number is (571) 272-8711. The examiner can normally be reached on Monday - Friday, 9 AM - 5 PM.

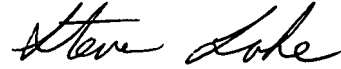
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steven Loke can be reached on (571) 272-1657. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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/HQH/
Hoang-Quan Ho
Junior Examiner
July 22, 2007

STEVEN LOKE
SUPERVISORY PATENT EXAMINER

A handwritten signature in black ink, appearing to read "Steven Loke", written in a cursive style.